Active Circuits
Lecture 0: Introduction

ELC 302 – Spring 2012

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This Course

Information

- Teaching Assistants:
  - Eng. Omar Abdelmonem
  - Eng. Ahmed Eissa

- Office hours:
  - Tuesday: 12-2 pm
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Course Objective

- Acquire a thorough understanding of the basic principles of filter design;
  - Focus on concepts, architectures and design challenges;
  - Preparation for further studies.
- Strategy
  - Acquire breadth understanding via a survey of existing architectures and techniques;
  - Acquire depth through a midterm project that entails design and thorough simulations of a specific circuit example in modern technology.

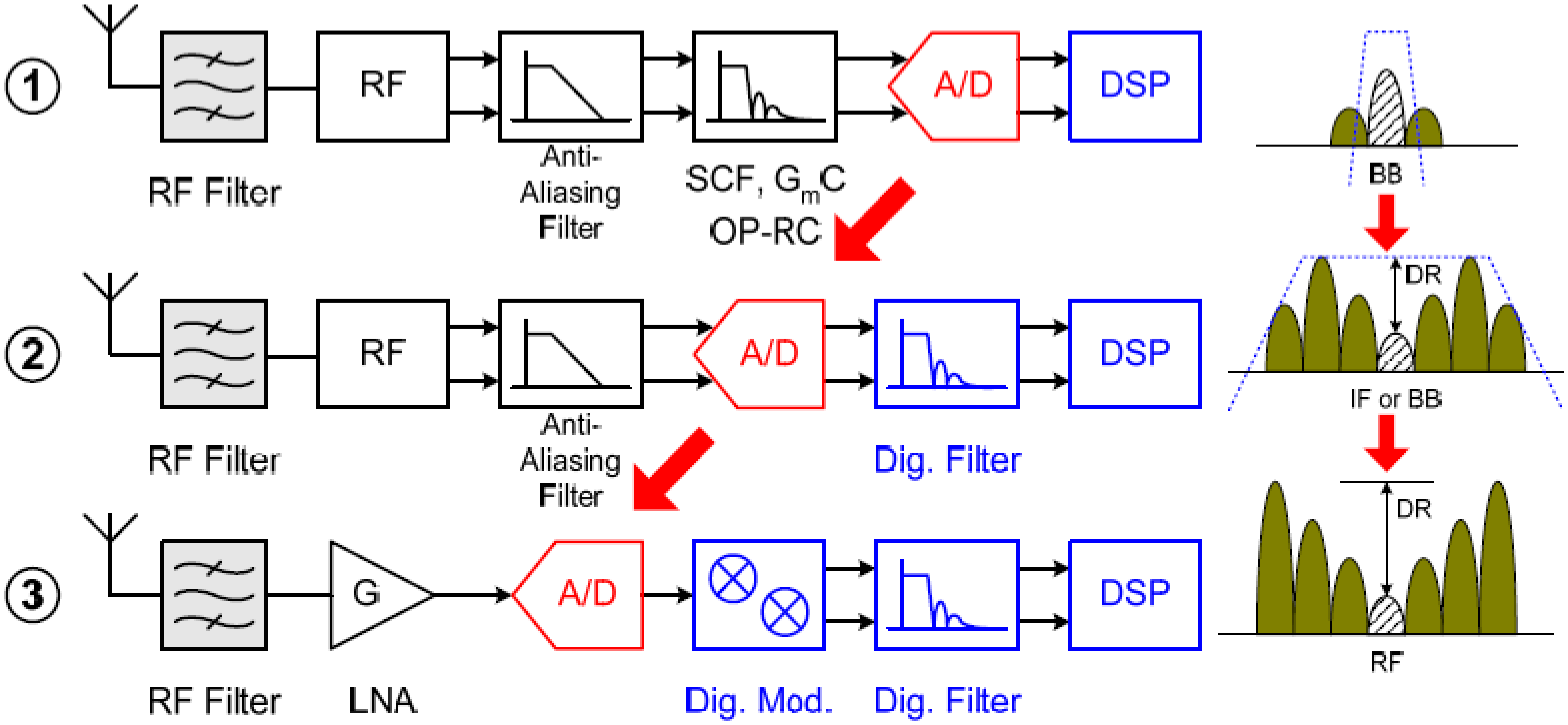
This Course

Assignments

- 2 Quizzes: 10%
- Midterm Projects: 20%
  - Project 1:
  - Project 2:
  - Project 3:
- Final Exam: 70%

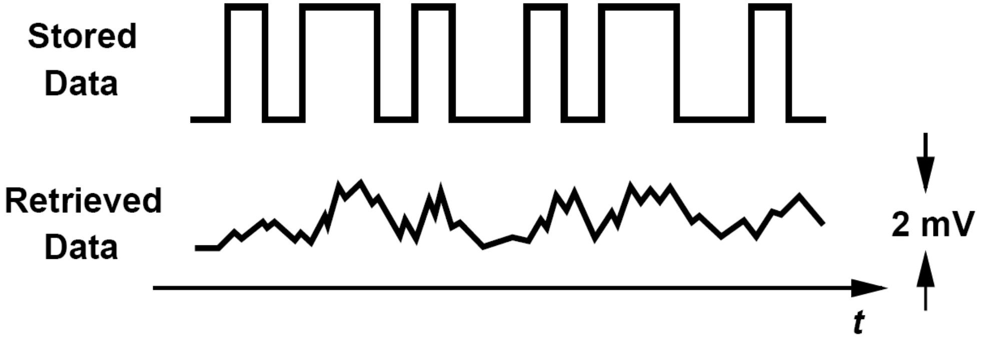
Why Filters?

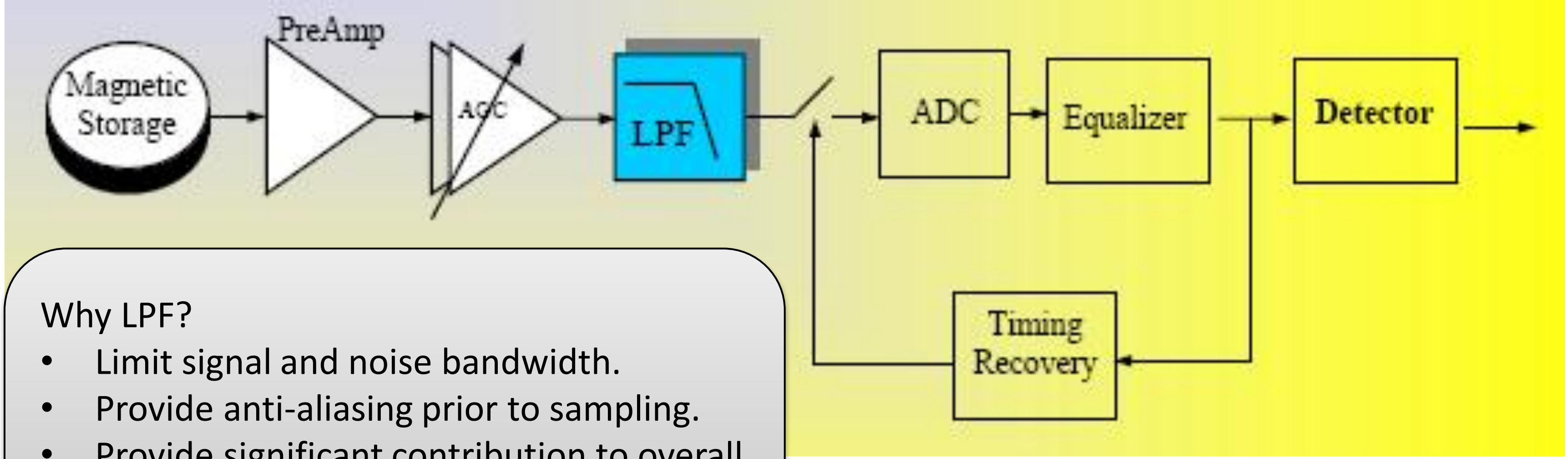
- Example 1: Communication Receiver



Why Filters?

- Example 2: Hard Disk Drive (HDD)





Why LPF?

- Limit signal and noise bandwidth.
- Provide anti-aliasing prior to sampling.
- Provide significant contribution to overall equalization.

This Course

Course Contents

Lecture #	Topic	Assessment
1	Introduction	
2	Filter Approximation and Frequency Transformation	
3	First Order Filters	
4	Two and three amplifier biquad filters	
5	Higher-Order Filters (Cascaded and Leapfrog)	Project 1
6	Active Inductors	Quiz 1 (Lectures 1-5)
7	Negative Resistors	
8	Introduction to Gm-C filters	
9	Circuit Implementation of Transconductors – I	Project 2
10	Circuit Implementation of Transconductors – II	
11	Gm-C Filter implementation	Quiz 2 (Lectures 6-10)
12	TBD	Project 3

This Course

References

- T.L.Deliyannis, Y.Sun, J.K.Fidler, “Continuous-time active filter design”.